

## Missouri Department of Natural Resources

# Total Maximum Daily Load Information Sheet

## Elkhorn Creek

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### Waterbody Segment at a Glance:

**County:** Montgomery  
**Nearby Cities:** Montgomery City  
**Length of impairment:** 2 miles  
**Pollutant:** Biochemical Oxygen Demand (BOD), Non-volatile Suspended Solids (NVSS), and Volatile Suspended Solids (VSS)  
**Source:** Montgomery City Wastewater Treatment Plant



State map showing location of watershed

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**TMDL Priority Ranking:** High

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### Description of the Problem

#### Beneficial uses of Elkhorn Creek

- Livestock and Wildlife Watering
- Protection of Warm Water Aquatic Life
- Protection of Human Health (associated with Fish Consumption)

#### Use that is impaired

- Protection of Warm Water Aquatic Life

#### Standards that apply

- The Missouri Water Quality Standard (WQS), found in 10 CSR 20-7.031 Table A, for dissolved oxygen (related to BOD) in streams is 5.0 mg/L (milligrams per liter or parts per million).
- Standards for VSS and NVSS may be found in the general criteria section of the WQS, 10 CRS 20.7.031 (d) (A) (C) which states:
  - Waters shall free from substances in sufficient amounts to cause the formation of putrescent, unsightly or harmful bottom deposits or prevent full maintenance of beneficial uses.
  - Waters shall be free from substances in sufficient amounts to cause unsightly color or turbidity, offensive odor or prevent full maintenance of beneficial uses.

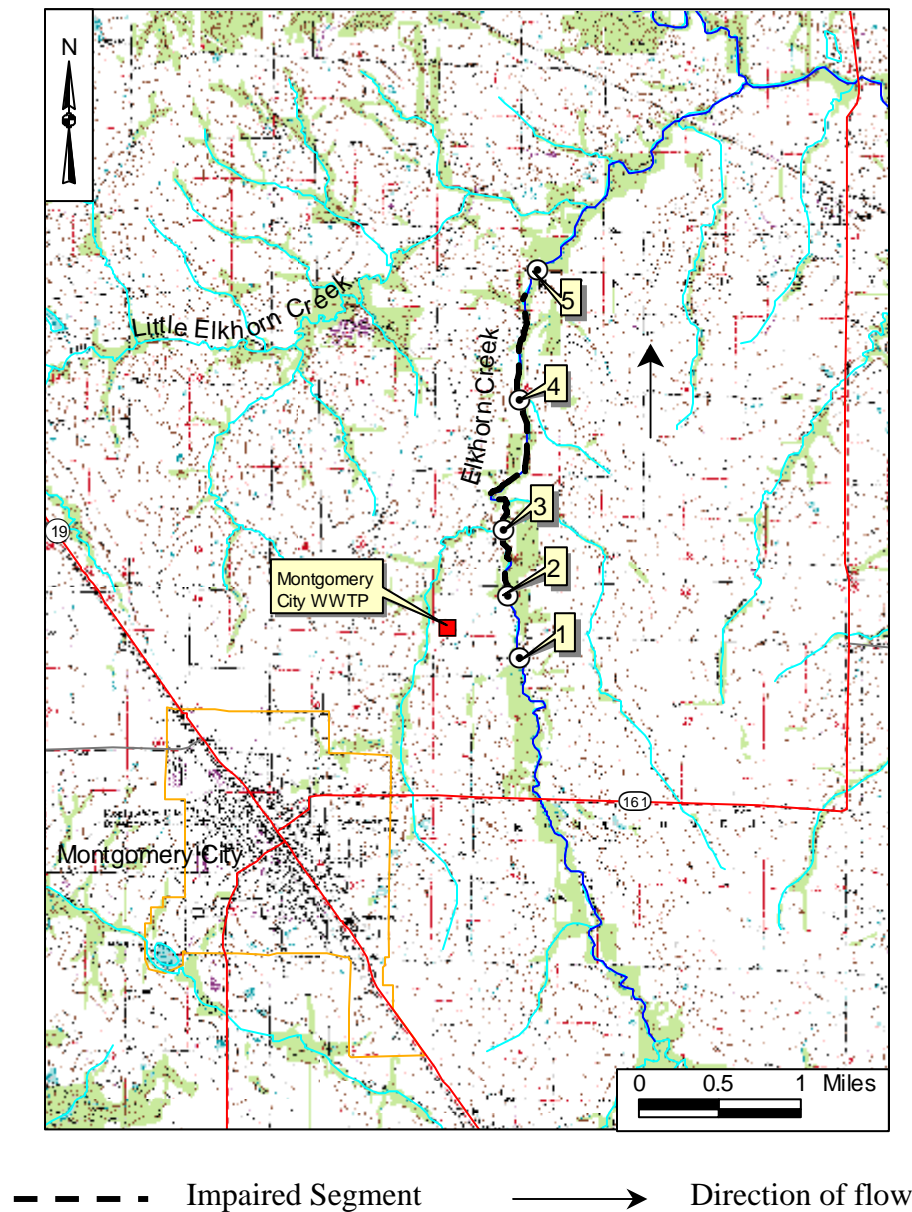
### Background Information and Water Quality Data

This stream shows low levels of dissolved oxygen (DO), a stream measurement that relates to Biochemical Oxygen Demand, downstream from Montgomery City's NE wastewater treatment plant (WWTP). Wastewater high in BOD reduces the amount of dissolved oxygen in the stream. Most

aquatic organisms require high levels of oxygen to survive. Like all wastewater discharges in Missouri, the Montgomery City NE WWTP has to meet the requirements of a discharge permit issued by Missouri Department of Natural Resources. The permit requires stricter discharge limits by March of 2008 for BOD and ammonia (which is toxic to aquatic life). Stricter limits also apply to Total Suspended Solids (TSS) which includes Non-Volatile (inorganic like sand and grit) and Volatile (like sludge and algae) Suspended Solids. The city is planning construction of major improvements to the WWTP in 2006 that will improve the water quality in Elkhorn Creek.

A map of the sampling sites and tables of the water quality data follows.

**Impaired Portion of Elkhorn Creek, Montgomery County, Missouri**



The index to the site numbers is on the next page.

**Index for Sampling Sites**

- 1 – Elkhorn Creek upstream of Montgomery City NE WWTP
- 2 – Montgomery City NE WWTP effluent outfall
- 3 – Elkhorn Creek 1.0 mile downstream of NE WWTP
- 4 – Elkhorn Creek 2.3 miles downstream of NE WWTP
- 5 – Elkhorn Creek 3.0 miles downstream of NE WWTP

**Results from Stream Survey for Elkhorn Creek– mean for July 14 and 15, 2004**

| Site # | Flow<br>(cu<br>ft/sec) | temp<br>- am<br>°C | DO –<br>am<br>(mg/L) | CBOD<br>(mg/L) | SC<br>(mmhos<br>/cm) | Ammonia-<br>N (mg/L) | TSS<br>(mg/L) | VSS<br>(mg/L) |
|--------|------------------------|--------------------|----------------------|----------------|----------------------|----------------------|---------------|---------------|
| 1      | 2.09                   | 23.0               | 6.5                  | 0.99           | 178                  | 0.01499              | 17.0          | 2.499         |
| 2      | 0.39                   | 23.6               | 4.1                  | 8.8            | 1320                 | 5.71                 | 15.5          | 13.5          |
| 3      | 4.66                   | 25.6               | 4.1                  | 1.9            | 332                  | 0.08                 | 25.7          | 7.0           |
| 4      | 4.06                   | 25.6               | 5.2                  | 2.6            | 271                  | 0.01499              | 20.7          | 8.3           |
| 5      | 3.88                   | 24.9               | 5.4                  | 2.6            | 265                  | 0.01499              | 19.7          | 7.8           |

Source: Missouri Department of Natural Resources

**Results from Stream Survey for Elkhorn Creek– mean for August 4 and 5, 2004**

| Site # | Flow<br>(cu<br>ft/sec) | temp<br>- am<br>°C | DO –<br>am<br>(mg/L) | CBOD<br>(mg/L) | SC<br>(mmhos<br>/cm) | Ammonia-<br>N (mg/L) | TSS<br>(mg/L) | VSS<br>(mg/l) |
|--------|------------------------|--------------------|----------------------|----------------|----------------------|----------------------|---------------|---------------|
| 1      | 0.01                   | 21.5               | 5.6                  | 0.99           | 569                  | 0.01499              | 42.0          | 10.8          |
| 2      | 0.4                    | 21.9               | 4.4                  | 5.0            | 1058                 | 5.32                 | 6.3           | 6.3           |
| 3      | 0.35                   | 23.3               | 9.7                  | 3.9            | 936                  | 0.02                 | 19.0          | 13.8          |
| 4      | 0.14                   | 23.4               | 7.5                  | 3.6            | 875                  | 0.01499              | 10.8          | 9.0           |
| 5      | 0.17                   | 23.0               | 6.1                  | 2.1            | 817                  | 0.01499              | 10.5          | 8.4           |

Source: Missouri Department of Natural Resources

**For more information call or write:**

Missouri Department of Natural Resources

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